

# 1.3

## Segments and Their Measures

- Goals**
- Use segment postulates.
  - Use the Distance Formula to measure distances.

MIDPOINT

### VOCABULARY

Postulates

Coordinate

Distance

Length

Between

Distance Formula

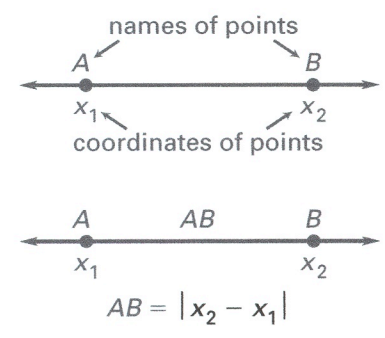
Congruent segments

### POSTULATE 1: RULER POSTULATE

The points on a line can be matched one to one with real numbers. The real number that corresponds to a point is the \_\_\_\_\_ of the point.

The \_\_\_\_\_ between points  $A$  and  $B$ , written as  $AB$ , is the absolute value of the difference between the coordinates of  $A$  and  $B$ .

$AB$  is also called the \_\_\_\_\_ of  $\overline{AB}$ .

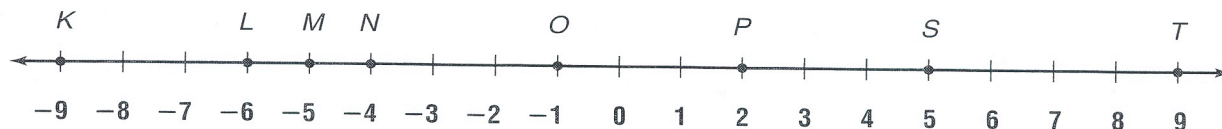


**Skills Practice**

BB 1.3/1.5

**Congruent Segments**

Use the number line to determine whether each statement is true or false. Explain your reasoning.



1.  $\overline{LM}$  is congruent to  $\overline{NO}$ .
2.  $\overline{OS}$  is congruent to  $\overline{OL}$ .
3.  $M$  is the midpoint of  $\overline{LN}$ .
4.  $\overline{PS}$  is congruent to  $\overline{NO}$ .
5.  $O$  is the midpoint of  $\overline{LS}$ .
6.  $\overline{KS}$  is congruent to  $\overline{LT}$ .
7.  $\overline{PS}$  is congruent to  $\overline{KL}$ .
8. The origin is the midpoint of  $\overline{KT}$ .

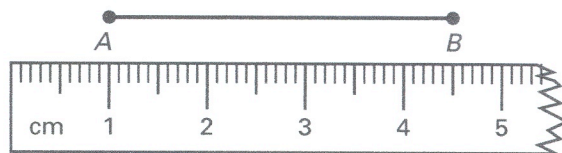
Determine whether each statement is true or false. Explain your reasoning.

9. If  $\overline{GH} \cong \overline{AZ}$ , then  $GH = AZ$ .
10. Every segment has only one midpoint.
11. A ray cannot bisect a segment.
12. If  $\overline{DE} \cong \overline{WX}$  and  $\overline{WX} \cong \overline{SP}$ , then  $\overline{DE} \cong \overline{SP}$ .
13. If a segment has been bisected, then it is separated into two congruent segments.
14. If  $M$  is the midpoint of  $\overline{AB}$ , then  $\overline{AM} \cong \overline{MB}$ .
15. A plane cannot bisect a segment.
16. If points  $A$ ,  $B$ , and  $C$  are collinear, then  $B$  lies between  $A$  and  $C$ .
17. A segment can have several midpoints.
18. If  $Y$  is between  $X$  and  $Z$ , then  $XY = YZ$ .

**Example 1** Finding the Distance Between Two Points

Measure the length of the segment to the nearest tenth of a centimeter.

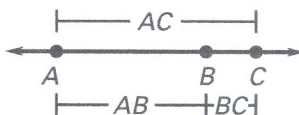
$$\begin{aligned} AB &= | \quad - \quad | \\ &= \quad \end{aligned}$$



**Answer** The length of  $\overline{AB}$  is about 3.5 centimeters.

**POSTULATE 2: SEGMENT ADDITION POSTULATE**

If  $B$  is between  $A$  and  $C$ , then  $AB + BC = AC$ . If  $AB + BC = AC$ , then  $B$  is between  $A$  and  $C$ .

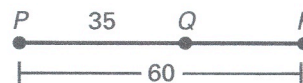


Use the Segment Addition Postulate to find the length.

3. Find  $JL$ .



4. Find  $QR$ .

**LESSON****1.3**

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**Practice A**

For use with pages 17–25

Draw a sketch of the three collinear points. Then write the Segment Addition Postulate for the points.

7.  $S$  is between  $D$  and  $P$ .

8.  $J$  is between  $S$  and  $H$ .

9.  $C$  is between  $Q$  and  $R$ .

10.  $T$  is between  $M$  and  $N$ .

In the diagram of collinear points,  $GK = 24$ ,  $HJ = 10$ , and  $GH = HI = IJ$ . Find each length.

11.  $HI$

12.  $IJ$

13.  $GH$



14.  $JK$

15.  $IG$

16.  $IK$



## Study Guide

BB 1.3/1.5

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## Congruent Segments

Two segments are congruent if they have the same length. The **midpoint** of a segment separates the segment into two congruent segments. To **bisect** a segment means to separate it into two congruent parts. The midpoint always bisects a segment.

Use the line to name all segments congruent to each given segment.



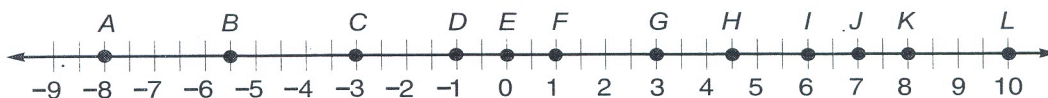
1.  $\overline{HM}$

2.  $\overline{JL}$

3.  $\overline{NJ}$

4.  $\overline{HI}$

Use the number line to name the midpoint of each segment.



5.  $\overline{EI}$

6.  $\overline{IL}$

7.  $\overline{AK}$

8.  $\overline{CF}$

9.  $\overline{AC}$

10.  $\overline{DL}$

11.  $\overline{CG}$

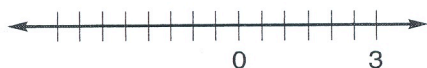
12.  $\overline{IK}$

For each exercise below, the coordinates of points  $P$  and  $Q$ , respectively, are given. Graph  $P$  and  $Q$ . Then draw and label the coordinate of the midpoint of  $PQ$ .

13. -4 and 2

14. -9 and -5

15. -3 and 4



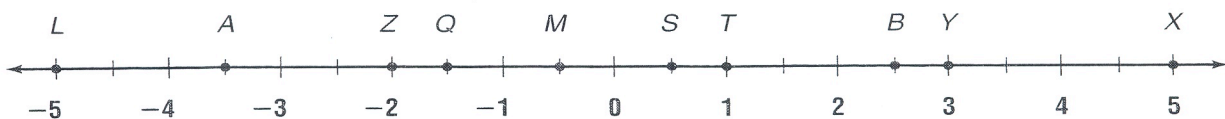
**Study Guide***Blue Book 1.3***Real Numbers and Number Lines**

Numbers can be grouped into sets with identifying characteristics.

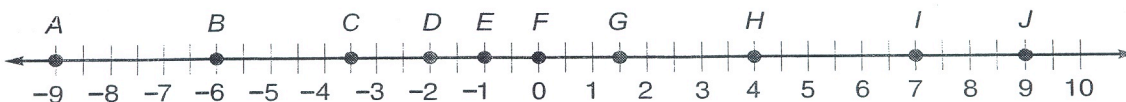
Sets of Numbers		
Name	Definition	Examples
<b>whole numbers</b>	0 and the natural, or counting numbers	0, 1, 2, 3, ...
<b>integers</b>	0, the positive integers, and the negative integers	... -3, -2, -1, 0, 1, 2, 3, ...
<b>rational numbers</b>	any number of the form $\frac{a}{b}$ , where $a$ and $b$ are integers and $b \neq 0$	$\frac{1}{3}$ , 7.9, $2\frac{5}{8}$ , 9.3686868 ...
<b>irrational numbers</b>	decimals that neither terminate nor repeat	0.513947836 ..., 1.010010001 ...
<b>real numbers</b>	rational and irrational numbers	$4.\overline{68}$ , $\frac{9}{11}$ , -21.494994999 ...

Each real number corresponds to exactly one point on a number line. The distance between two points on a number line is the positive difference of their coordinates.

**Use a number line to find each measure.**

9. *LX*10. *TX*11. *ZT*12. *LZ*13. *QM*14. *MS*15. *BX*16. *BT*17. *ST*18. *LQ*19. *BY*20. *AX*

**Use the number line to find each measure.**

4. *HI*5. *AD*6. *BH*7. *AJ*8. *BC*9. *CG*10. *CJ*11. *FC*

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2-1  
sk practice*

## Skills Practice

Blue Book 1.3

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## Segments and Properties of Real Numbers

Three segment measures are given. The three points named are collinear. Determine which point is between the other two.

1.  $XY = 15$ ,  $AY = 31$ ,  $AX = 46$

2.  $AB = 12$ ,  $BC = 20$ ,  $AC = 32$

3.  $MO = 75$ ,  $MC = 34$ ,  $OC = 41$

4.  $DE = 58$ ,  $GE = 12$ ,  $DG = 70$

5.  $HM = 2$ ,  $JM = 1$ ,  $HJ = 3$

6.  $WX = 8$ ,  $WA = 4$ ,  $AX = 4$

Use the line to find each measure.



7. If  $AC = 10$  and  $CG = 21$ , find  $AG$ .

8. If  $AI = 72$  and  $GI = 11$ , find  $AG$ .

9. If  $CG = 24$  and  $EG = 14$ , find  $CE$ .

10. If  $AK = 80$  and  $IK = 24$ , find  $AI$ .

11. If  $AC = 18$  and  $CK = 72$ , find  $AK$ .

12. If  $CI = 65$  and  $GI = 13$ , find  $CG$ .

Find the length of each segment in centimeters and in inches.

13. \_\_\_\_\_

14. \_\_\_\_\_

15. \_\_\_\_\_

16. \_\_\_\_\_